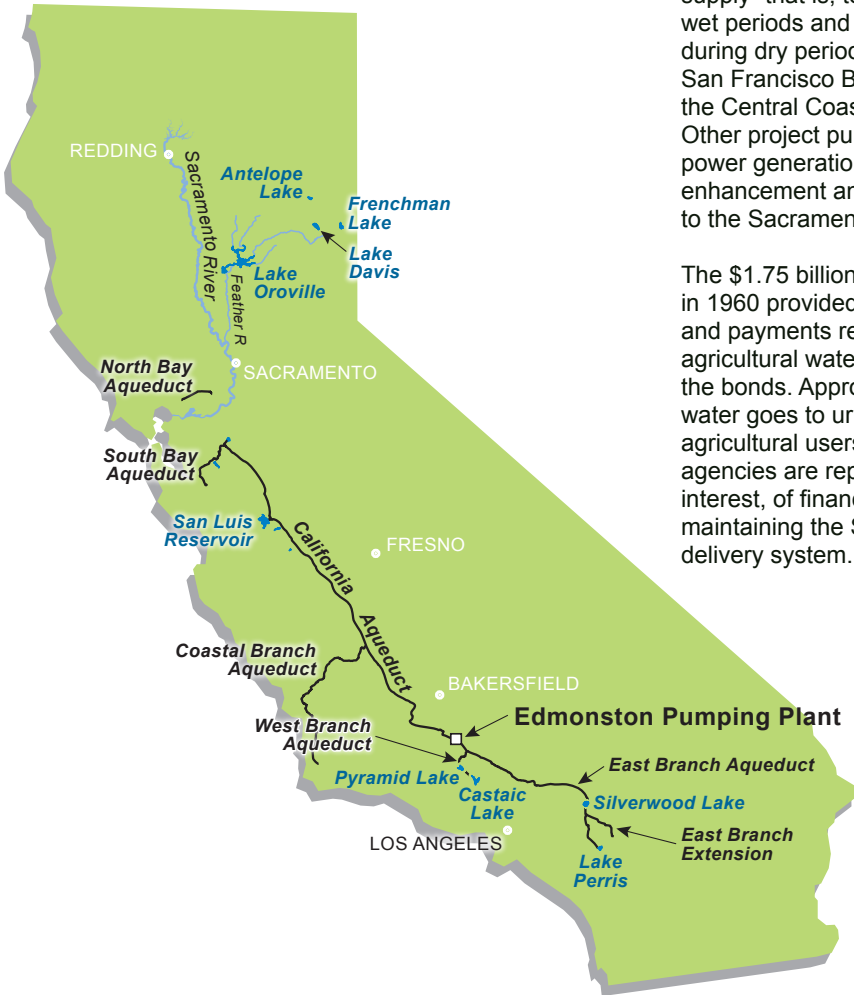


### Edmonston Pumping Plant

Located at the foot of the Tehachapi Mountains, the Edmonston Pumping Plant is the largest pumping facility of the State Water Project. Designed, built and operated by DWR, the plant raises water from the California Aqueduct nearly 2,000 feet up the Tehachapis where it crosses the mountain range through a series of tunnels into Southern California.

Edmonston Pumping Plant's construction took place from 1967 to 1973. Southern California counties received their first deliveries of Project water in 1971.



### THE STATE WATER PROJECT

Planned, designed, constructed and operated by the California Department of Water Resources (DWR), the State Water Project (SWP) is the largest state-built, multi-purpose, user-financed water project in the United States.

The SWP, spanning more than 600 miles from Northern California to Southern California, includes 34 storage facilities, 20 pumping plants, four pumping-generating plants, five hydroelectric power plants and approximately 700 miles of canals, tunnels and pipelines.

The SWP's main purpose is to provide a water supply- that is, to divert and store water during wet periods and distribute it to areas of need during dry periods in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast and Southern California. Other project purposes include flood control, power generation, recreation, fish and wildlife enhancement and water quality improvements to the Sacramento-San Joaquin Delta.

The \$1.75 billion bond measure approved in 1960 provided initial funding for the SWP, and payments received from 29 urban and agricultural water agencies are paying off the bonds. Approximately 70 percent of SWP water goes to urban users and 30 percent to agricultural users. These SWP contracting agencies are repaying the cost, including interest, of financing, building, operating and maintaining the SWP water storage and delivery system.

# STATE WATER PROJECT

## EDMONSTON PUMPING PLANT

### California Department of Water Resources' Mission...

*To manage the water of California, in cooperation with other agencies, to benefit the State's people, and to protect, restore and enhance the natural and human environments.*

### INFORMATION

Visit DWR'S Web site at  
<http://www.dwr.water.ca.gov>  
or email to [PAOPublications@water.ca.gov](mailto:PAOPublications@water.ca.gov)

If you need this publication in an alternate form,  
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### Design

The design and construction of Edmonston Pumping Plant presented engineers with a demanding set of challenges. To cross the Tehachapis, water would have to be raised nearly 2,000 feet and flow through approximately 10 miles of rugged mountain range. At full capacity operation, the quantity of water moved would be almost two million gallons a minute.

The U-shaped design of the plant is unique; no other SWP facility is similarly constructed. The plant consists of 14 motor-pump units, each standing over 65 feet high and weighing 420 tons. Seven units are located in each of the two wings, each of which is nearly as long as a football field. Each unit discharges water into a manifold which connects into a main discharge line tunnel measuring 12.5 feet in diameter for its first half and 14 feet in diameter in the last half. The two main discharge lines, each containing 8.5 million gallons of water at all times, stair-step 8,400 feet up the mountain side into a 68-foot high, 50-foot diameter surge tank. (The surge tank prevents tunnel damage from large pressure changes that can occur when valves in the pumping plant are suddenly opened or closed.)

Near the top of the lift, the 14-foot diameter valves can close each discharge line in the event of a system rupture and minimize water flowing back down into the plant below. Other valves seal off the individual pump units from the manifold at plant level.

### Forebay

At the upstream entrance to the plant, the aqueduct enlarges into a small wedge-shaped holding area called a “forebay,” 70 feet deep. This design allows a smooth intake of water directly to the pumps. Trashracks keep debris out of the pumps and when necessary, steel gates can be used to block off the water intakes to the pump units.

### Inside The Plant

Water enters the plant from the bottom of the forebay. About 142,000 gallons of water flow through each pump during every minute that it



operates. An acre-foot of water (about 326,000 gallons, the average amount of water that two families use in a year) is pumped in a little over two minutes.

Two motor generator sets are used to start the 80,000 horsepower (hp) motor-pump units. These 35,000 hp motors drive the generators



that gradually transfer power to the pump units, which are too massive to start by switching power directly to them.

Using this system, three to four minutes are needed to start each pump. When operating, each motor-pump unit normally uses about 60 million watts, enough power to light up 600,000 100-watt light bulbs.

The electrical gallery is where power lines enter the building. (About 946 miles of wire and cable were used for the plant’s electrical systems.)

In the control room, operations staff monitors the equipment 24 hours a day. The control room is connected to the Area Control Center of the San Joaquin Field Division, which is responsible for operation and maintenance of all SWP facilities located between Kettleman City and the Tehachapi Mountains.

### Seismic Safety Features

The Edmonston Pumping Plant is located in a seismically active area. The project alignment crosses the Garlock Fault and numerous other faults, while the San Andreas Fault passes 5.5 miles from the south portal (outlet) of the Tehachapi crossing’s tunnel system. Because of these seismic conditions, many of the plant’s features were designed to minimize earthquake damage.

To withstand earthquake shocks, the foundation of the plant rests on bedrock, allowing the facility to “float” on the rock surface. Approximately 190,000 cubic yards of reinforced concrete were used in the plant, enough to pave nearly 30 miles of a four-lane highway.

### Tehachapi Tunnels

Upon leaving the surge tank located approximately 2,000 feet above Edmonston Pumping Plant, water enters a 23.5-foot diameter line and flows by gravity through a series of four tunnels in the Tehachapi Mountains. These tunnels are connected by siphons or cast-in-place pipe sections which also provide worker access to the system at critical fault crossings.

After its 10-mile journey from Edmonston Pumping Plant to the Tehachapi Afterbay, the water continues to the bifurcation (split) of the California Aqueduct into the West Branch and East Branch aqueducts.



### A.D. Edmonston

As former California State Engineer and Chief of the Division of Water Resources from 1950-55, Arthur D. Edmonston directed the early planning of the Central Valley Project, the State Water Project and the State

Water Plan. He actively supported State financial assistance to build the State Water Project.

He was also secretary of the State Water Resources Control Board, Executive Officer of the State Water Project Authority and a member of five other boards and commissions dealing with water issues.

